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SOLIDAGO RADULA Nutt. Journ. Acad. Phila. 7: 102. 1834.

Found for the first time east of the Alleghenies on August 18th, 1891, by Mr. Heller and myself growing on dry hillsides, just west of the Falls mountains, Stanley county, North Carolina, and observed for several succeeding years. This is an interesting addition to the eastern flora.

HELIANTHUS OCCIDENTALIS Riddell, Suppl. Cat. Ohio Pl. 13. 1836.

This prairie species occurs in a meadow near Logansville, Georgia, about twenty-five miles east of Atlanta. This seems to be the first record of its occurrence east of the Blue Ridge.

Notes on *Potentilla*.—III.

BY P. A. RYDBERG.

With the exception of two species, viz., the white-flowered *P. tridentata* Soland., and the introduced *P. nemoralis* Nestl., all the North American perennial species with ternate leaves can be divided into two natural groups, viz., the *Niveae*, with leaves densely white-tomentose beneath, and the *Frigidae*, without tomentum. Both groups consist of plants generally less than 2 dm. high and often more or less caespitose. The style is terminal or nearly so, filiform but short, in all, except *P. flabellifolia*, not longer than the mature achenes. All the species are arctic or alpine.

To the *Niveae* belong the following:

POTENTILLA VILLOSA Pall.; Pursh, Fl. Am. Sept. 353. 1814.

P. fragiformis villosa Regel & Tiling, Fl. Ajan. 85.

Watson follows Regel & Tiling in placing *P. villosa* as a variety under *P. fragiformis*. The two resemble each other in one important character, viz., the broadly oval obtuse bractlets, which, as well as the calyx, enlarge considerably in fruit. *P. villosa* differs from *P. fragiformis*, however, in the leaves as well as in the flowers; those of the former are much thicker, densely silky above (rarely glabrate), and densely floccose and with prominent veins beneath. The flowers are about one-half larger than those of *fragiformis*. From all the species of the group it differs in the large 2-3 cm. wide

flowers, stout habit, large leaves and broad bractlets. *P. villosa* is a native of Alaska and adjacent Asia, but is also found in the mountains of British Columbia, Vancouver Island and Washington.

POTENTILLA HOOKERIANA Lehm. Ind. Sem. Hort. Bot. Hamb.
1849: Add. 10. 1849.

Dr. Watson placed this with *P. Pennsylvanica* on account of the style. It is glandular, but scarcely thickened near the base, and not curved as in *P. Pennsylvanica*. In habit it comes nearest to *P. nivea*; and as the style is often glandular in *P. villosa* and sometimes in *P. nivea*, it is better to include *P. Hookeriana* in this group, with which it agrees in all other respects. It differs from *P. nivea* in the more deeply dissected leaves, the smaller flowers, the bractlets, which equal the sepals, and a slightly stricter habit. It is a very rare plant.

POTENTILLA NIVEA L. Sp. Pl. 499. 1753.

The common form of this species is fully as tall as either of the two preceding, but very slender. The flowers are only 15 mm. in diameter, the bractlets linear-oblong or lanceolate, shorter than the ovate-lanceolate sepals. The obcordate petals only a little exceed the sepals. The leaflets are 1-3 cm. long, oblong or obovate, with broad teeth. *P. nivea* is distributed throughout the arctic regions and in the higher mountains of the northern hemisphere. In America it ranges from Labrador to Alaska, extending in the Rockies as far south as Colorado.

P. nivea is very variable. The following varieties have been collected in America:

POTENTILLA NIVEA MACROPHYLLA Hook. Bot. Mag. 57: pl.
2982.

Leaflets very large and deeply incised; plant taller than the ordinary form.

POTENTILLA NIVEA QUINQUEFOLIA.

P. nivea pentaphylla Lehm. Nov. Stirp. Pug. 9: 69. 1851. Not *P. pentaphylla* Richt.

P. nivea dissecta Wats. Proc. Am. Acad. 8: 559. 1873. Not *P. dissecta* Pursh, 1814.

Leaves quinate as well as ternate; leaflets deeply toothed, in the quinate leaves the lower ones often smaller.

POTENTILLA NIVEA UNIFLORA (Ledeb.).

Potentilla uniflora Ledeb. Mem. Acad. St. Petersb. 5: 543.

P. nivea Vahlia American authors, at least in part.

The true position of this plant is difficult to determine. It may be placed as a variety of *P. nivea* or of *P. Vahlia* or as a species intermediate between the two. Ledebour made it a variety of *P. villosa*, which it somewhat resembles as to the leaves. It has the caespitose habit, short nearly leafless stems, and short wedge-shaped leaves of *P. Vahlia*. Its flowers are nearly of the same size as those of that species, but the petals are obcordate, not reniform, and the sepals and bracts are those of *P. nivea*, depauperate forms of which grade into it. It is found in the arctic regions from Greenland to Alaska and adjacent Asia, but also in the Rocky Mountains of Colorado. Apparently all specimens labelled *P. nivea Vahlia* from the Rockies belong to *P. nivea uniflora*. It was evidently this form that Watson had in mind when he made the statement that *P. Vahlia* was a depauperate few-flowered form of *P. nivea*.

POTENTILLA VAHLIA Lehm. Monog. 172. 1820.

P. hirsuta Vahl; Hornem. Fl. Dan. pl. 1390. Not Michx.

This is very low and matted, the large flowers a little exceeding the leaves. The petals are very broadly subreniform, *i. e.*, broader than long, and therefore overlap each other; the bractlets are broadly oval, obtuse and about equal the ovate sepals. The whole plant is covered with yellowish villous hairs besides the tomentum. Lehmann was in some doubt whether he should regard it as a variety of *P. nivea* or as a distinct species. He made it a species on the authority of Vahl, who knew the plant in its native haunts. Seeing only *P. nivea* and *P. Vahlia* nobody would hesitate in assigning specific rank to the latter. The trouble comes in when one is to draw the line between either and *P. uniflora*. Lehmann states that *P. Vahlia* was collected by Richardson in

Captain Franklin's journey. Specimens collected by Richardson and named *P. Vahlia* are in the Torrey Herbarium at Columbia, but these, it seems to me, rather belong to *P. uniflora*. There is, however, from the same collector one specimen, a very small one, indeed, which without any doubt belongs to *P. Vahlia*, but this is together with two specimens of *P. nana* under the name *P. nivea arctica*. Except this specimen and one from Herald Island, all specimens seen are from Greenland and the islands of Baffin Bay. They are generally labelled *P. pulchella*. The latter species is easily distinguished by its small flowers, the petals scarcely exceeding the sepals, and its deeply dissected leaves which are pinnate with two approximate pairs of leaflets.

The *Frigidae* differ from the *Niveae* principally in the lack of tomentum. They are all low, more or less caespitose, arctic or alpine plants. To this group belong the following :

POTENTILLA ROBBINSIANA Oakes; Torr. & Gray, Fl. N. Am. 1 : 441.
1838, as a synonym under

P. minima Robbinsiana Torr. & Gray, *l. c.*

P. frigida American authors, not Vill.

Torrey and Gray placed this species as a variety under *P. minima* and Watson transferred it to *P. frigida*. It very much resembles both of those European species. It comes nearest to *P. minima* in habit, but to *P. frigida* in pubescence. It differs from both in the small petals, which about equal the sepals, and in the bracts and the sepals, which are very narrow and subequal. In both *P. frigida* and *P. minima* the petals are longer than the sepals, and these much longer than the bractlets. The same characters that distinguish *P. Robbinsiana* from the two species mentioned distinguish it also from its American relatives. The range of *P. Robbinsiana* is very limited. It apparently is confined to the White Mountains of New Hampshire.

POTENTILLA ELEGANS Schlecht. & Cham. Linnæa, 2 : 22. 1827.

This species, as far as I know, has not yet been collected in America, but is mentioned here because it is quite common across Behring Strait and may be found in Alaska. It resembles *P. Robbinsiana* in the sepals and bracts, but is a more delicate plant, the leaflets being only 3-5 mm. long and nearly glabrous.

POTENTILLA EMARGINATA Pursh, Fl. Am. Sept. 1: 353. 1814.

This species was described from specimens collected by Kohlmeister in Labrador. According to Lehmann (Hook. Fl. Bor. Am. 1: 194), *P. nana*, also, was collected by the same missionary. There is therefore a doubt which of the two is the original *P. emarginata*. The latter, as understood by Vahl, Lehmann and others, is a stouter plant than *P. nana*, has very narrow bracts, and leaves with acute teeth, of which the terminal is generally the largest. In both the flowering stems scarcely exceed the leaves. *P. emarginata* grows in Labrador, the Baffin Bay region, Greenland and Spitzbergen.

POTENTILLA NANA Willd. Mag. Gesell. Naturf. Fr. Berl. 7: 296. 1813.

Dr. Watson states that this is a depauperate form of *P. emarginata*. As understood by Lehmann, it is a plant much nearer related to *P. fragiformis*. The habit is caespitose, as in *P. emarginata*, but the teeth of the leaves are rounded and the terminal one generally smaller, and the bractlets are broadly elliptical and enlarge in fruit, as in *P. fragiformis*, from which it differs mainly in size, being in every respect smaller, and in the fact that the flowering stems scarcely exceed the leaves. A connecting link is formed by the Greenland *P. Friesiana*, which resembles *P. nana* in every respect, except that the flowering stems are elongated, as in *P. fragiformis*. Probably all three are but forms of one species. *P. nivea arctica*, at least as to Richardson's plant, must be included in *P. nana*. It ranges through arctic America from Labrador to Alaska, and is also found in eastern Siberia.

POTENTILLA FRAGIFORMIS Willd. Mag. Gesell. Naturf. Fr. Berl. 7: 294. 1813.

Differs from *P. nana* in being in every respect more robust and with stems 1-2 dm. high. It somewhat approaches *P. villosa* in habit, but lacks the tomentum and has much smaller flowers. It comes nearest the Caucasian and Siberian *P. gelida* Meyer, but differs in its hirsute pubescence. *P. fragiformis* is mainly Siberian, but has been collected on the Aleutian Islands.

POTENTILLA FLABELLIFOLIA Hook.; Torr. and Gray. Fl. N. Am. 1: 442. 1838.

P. gelida American authors, not Meyer.

This is near *P. gelida* and has generally been included therein, but differs in its much larger flowers, lighter foliage and a thicker creeping rootstock; it is best to regard it as at least a good variety. If the isolated range is taken in consideration, it is still better to regard it as a species. *P. flabellifolia* is found on the higher mountains of Oregon and Washington, while *P. gelida* grows in the Caucasus and eastern Siberia.

Near *Frigidae* is another group, which may be called *Brevifoliae*, consisting of only two species. It differs from the preceding group mainly in two characters, viz.: pinnately 3-5-foliolate leaves and a very long and slender style, which is fastened a short distance below the apex of the achene. Both species are low, less than 1½ dm. high, from a thickish branched rootstock.

POTENTILLA GRAYI Wats. Proc. Am. Acad. 8: 560. 1873.

In this species the leaflets are only three, broadly obovate or nearly obicular. The habit of the plant reminds one somewhat of *P. flabellifolia*, but the middle leaflet is considerably stalked, showing that the leaf is pinnate with only one pair, rather than ternate. As the style is of the same form and the same place of attachment as in *P. brevifolia*, it is better to let the two constitute a group by themselves, especially as the habit and flower is nearly the same. *P. Grayi* has been collected only in the mountains around the Yosemite valley, California.

POTENTILLA BREVIFOLIA Nutt.; Torr & Gray, Fl. N. Am. 1: 442.

This species has leaves with about two pairs of rounded 2-3-cleft and crenate leaflets, which are rather small, only ½-1 cm. long. Lehmann included it in the *Glandulosae* on account of the habit, which a little resembles that of the group mentioned, and the fact that the plant is somewhat glandular puberulent. As stated before, the style is very slender, filiform, not basal, but fastened near the apex; the anthers are not flat, and plainly divided into two lobes, and the petals are emarginate. It is confined to the alpine peaks of Oregon.